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COPING AND ANXIETY IN COLLEGE STUDENTS AFTER THE SEPTEMBER 11TH TERRORIST ATTACKS

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This study investigated the presence of a stress response after the September 11th terrorist attacks in a sample of indirectly affected college students living in Boston, Massachusetts. Anxiety was examined at two time intervals, approximately 2 and 4 months after the attacks. Methods of coping with the stress of the attacks (assessed using the COPE Inventory) and their impact on initial and longer-term anxiety were also examined. Results demonstrated that the majority of college students in the study were severely psychologically impacted initially by the terrorist attacks. However, this initial impact appears to decay over time for most people. Several potentially maladaptive coping strategies were found to be predictive of initial anxiety, including denial, behavioral disengagement, mental disengagement, and focus on and venting of emotions. However, only focus on and venting of emotions was found to be uniquely predictive of longer-term anxiety.

Keywords: Terrorism; September 11th; Anxiety & Coping

On September 11, 2001, Americans experienced an unprecedented collective tragedy. Estimates of the attacks' damage report the death of at least 3,062 Americans and the destruction of three buildings, a portion of the Pentagon, four airplanes, as well as massive collateral damage to infrastructure in New York City and at the Pentagon (''Dead and Missing,'' 2002). With the recent introduction of large-scale domestic and foreign terrorism into United States' society, there is a pressing need to increase our knowledge about the short and long-term psychological and social effects of this type of trauma on both individuals present at the attacks and individuals who were not present at the attacks.

Much of the existing research on the effects of terrorism both internationally and domestically has focused on posttraumatic stress disorder (PTSD) symptomatology in those who have been present at the attacks, directly affected individuals (Amir, Kaplan, & Kotler, 1996; Benight, Freyaldenhoven, Hughes, Ruiz, & Zoschke, 2000; Desivilya, Gal, & Ayalon, 1996; Kleinman, 1989; Shalev, 1992). However, there is little research on the effect of mass violence or other stressors related to terrorism on those

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who were not present at or did not witness these events, indirectly affected individuals. Nevertheless, the available evidence suggests the existence of long-term stressful effects in those indirectly impacted as long as two years after a terrorist attack (Pfefferbaum *et al*., 2000; Sprang, 2000, 2001).

Currently, debate exists about what constitutes indirect exposure to terrorism trauma, and the construct has been operationalized in various ways by studies that have examined populations who were not physically present at terrorist attacks. Studies have examined indirect exposure as a dimensional variable attempting to capture different situationally defined degrees of exposure to the attack (e.g. Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002). Other researchers have operationalized indirect exposure as viewing television news coverage of terrorist attacks and discussed the implications of media coverage on mental health (Duggal, Berezkin, & John, 2002; Fernando, 2002; Schlenger *et al*., 2002; Sokol, 2001).

Additionally, several studies have examined residence in a location distal from the site of a terrorist attack as an index of exposure (e.g. Kuhn, Rowell, Gusmano, Blanchard, & Rogers, 2002; Pfefferbaum *et al*., 2000). Preliminary research has demonstrated significant positive relationships between proximity of residence to a terrorist attack and increased psychological distress. This research suggests that geographic distance from attacks may be a clinically meaningful measure of indirect exposure to terrorist trauma (Galea *et al*., 2002; Kuhn *et al*., 2002; Schuster *et al*., 2001; Sprang, 1999). Available theories of vicarious traumatization or victimization suggest that geographic distance from the site of an attack may serve as a proxy for other variables such as fear for one's own safety, identification with or perceived similarity to victims, witnessing death and destruction, and changes in cognitive schemas (e.g. Janoff-Bulman, 1992; McCann & Pearlman, 1990; Solomon, Iancu, & Tyano, 1997; Young, 1989). However, to date there is insufficient evidence within terrorism research to explicate these relationships.

With respect to the aftermath of September 11th, recent reports demonstrate that many individuals not present at the attacks endorsed significant distress after the attacks. According to a study conducted within five days of the attacks, 90% of Americans endorsed one or more symptoms of distress to some degree, and 44% reported one or more symptoms of distress to a substantial degree (Schuster *et al*., 2001). A study conducted in the two weeks following the September 11th attacks found that 50.6% of Americans reported feeling very nervous and tense as a result of the tragedy, 45.9% reported feeling dazed and numb, and 50.2% reported trouble sleeping (Smith, Rasinski, & Toce, 2001). In a study examining reactions to the September 11th attacks in a mixed sample of directly and indirectly affected adults living below 110th street in Manhattan, researchers found a prevalence rate of 7.5% for PTSD and 9.7% for depression between five to eight weeks after the attacks (Galea *et al*., 2002). Silver and colleagues (2002) found that 17% of the United States' population outside of New York City reported PTSD symptoms two months after September 11th, and 5.8% reported these symptoms six months after the attacks. Taken together, these studies demonstrate the presence of an apparent stress reaction to the September 11th terrorist attacks in a large number of indirectly exposed individuals. Yet, the factors that mediate this response have not been evaluated sufficiently.

In addition to examining the presence of anxiety within the indirectly affected population after September 11th, it is important to explore how people in the general population cope with the ongoing threat of future attacks and to investigate the relationship between particular coping strategies and anxiety symptoms. To date, few studies have explored the effect of coping strategies on anxiety and distress levels in response to indirect exposure to terrorism or similar traumas (e.g. Gidron, Gal, & Zahavi, 1999; Weisenberg, Schwarzwald, Waysman, Solomon, & Klingman, 1993). Previous research examining the effect of coping styles after direct exposure to trauma suggests that avoidance coping is associated with higher levels of posttraumatic stress symptoms and active or problem-focused coping is associated with lower levels of symptomatology (e.g. Asarnow *et al*., 1999; Harvey-Lintz & Tidwell, 1997; Solomon, Mikulincer, & Avitzur, 1988; Sutker, Davis, Uddo, & Ditta, 1995). One recent study has extended these findings with direct trauma to Americans indirectly exposed to the attacks on September 11th, reporting that coping strategies involving emotional and behavioral disengagement were associated with higher levels of long-term global distress and active coping and acceptance were associated with lower levels of long-term distress (Silver *et al*., 2002). Coping theory also posits that excessive focusing on and venting of emotions related to a stressor may be maladaptive and impede adjustment (e.g. Carver, Scheier, & Weintraub, 1989). Overall, the scarcity of existing findings on coping with terrorism underscores the need for additional research on the sequelae of different coping strategies, particularly different forms of avoidance coping and focus on and venting of emotions, within the indirectly affected population.

In this study, we examined symptoms of anxiety related to the September 11th attacks in a convenience sample of students from Boston University, a large private university in Boston, Massachusetts. It should be noted that Boston is located approximately 200 miles from New York City and 450 miles from Washington, D.C. Boston's Logan Airport was also the point of departure for two of the hijacked airplanes on September 11th. Therefore, we expected a relatively high degree of indirect exposure in our sample. In contrast to almost all of the existing research into the psychological aftermath of indirect exposure to terrorism, which has been cross-sectional, this study examined anxiety in response to the September 11th terrorist attacks at two time intervals.

With the existing research suggesting that everyone in the United States was profoundly initially impacted by the enormity of September 11th, this study investigated both the nature of this initial stress response and the correlates of enduring terrorism-related anxiety, which may reflect a clinically significant problem. In particular, we evaluated methods of coping with the stress of the attacks approximately two months after the attacks, and we examined the impact of coping strategies on concurrent anxiety severity and anxiety two months later.

We hypothesized that indirectly affected college students would endorse anxiety symptoms, anger, and feelings of vulnerability after the September 11th attacks. We hypothesized that anxiety would decrease from Time 1 to Time 2 of the study in the absence of additional terrorist attacks in the United States. We also hypothesized that the coping strategies denial, behavioral disengagement, mental disengagement, and focus on and venting of emotions would be associated with anxiety at Time 1 and Time 2 of the study.

METHOD

Participants

178 undergraduate psychology students received experimental credits for their participation in both phases of the study. In the initial wave of data collection, 66 men and 112 women completed a packet of self-report questionnaires. The age of the initial sample ranged from 17 to 23 years old ($M = 18.65$, $SD = 1.72$). Thirty-six participants (20.22%) in the initial sample knew someone killed or injured in the September 11th attacks. One hundred and twenty three students from the original sample participated in the second wave of data collection. The Time 2 sample included 37 men and 86 women. The age of the second sample also ranged from 17 to 23 years of age ($M = 18.49$, $SD = 1.91$). Twenty-six participants (21.14%) in the Time 2 sample had personal knowledge of victims of the attacks.

Procedure

At Time 1 of the study, participants completed a packet of questionnaires under group administration conditions between one month and three months after the September 11th attacks. At Time 2 of the study, two months after a participant completed the initial administration of questionnaires, a second packet of questionnaires was mailed to each participant. Timing and the constraints of doing research with students enrolled in Introductory Psychology courses necessitated our use of different data collection procedures in order to facilitate follow-up recruitment.

Measures

The Time 1 questionnaire packet was composed of three self-report measures, which included the Beck Anxiety Inventory, the COPE Inventory, and a demographics questionnaire, including six questions assessing the subjective indirect impact of the terrorist attacks as measured by changes in thoughts and behaviors related to September 11th. The questionnaires mailed to participants at Time 2 of the study included an abbreviated demographics questionnaire and the Beck Anxiety Inventory.

The Beck Anxiety Inventory (BAI) is 21-item instrument designed to measure physical and psychological symptoms of anxiety that have troubled the participant over the past week. The participant rates each item on a four-point Likert-style scale ranging from 0–3 on the basis of the severity of their present state. Higher scores indicate higher levels of anxiety. In their initial psychometric testing of the scale, Beck, Epstein, Brown, and Steer (1988) reported that the BAI demonstrated good test-retest reliability over a one-week period ($r = 0.75$) and good internal consistency (Cronbach's $\alpha = 0.92$). Cronbach's alpha values for the BAI calculated with the study sample were similarly high ($\alpha = 0.88$).

The COPE Inventory is a multidimensional inventory, which assesses the different ways in which individuals respond to stress. The COPE Inventory has thirteen scales, all with four items each. Five scales measure different aspects of problem-focused coping, including active coping, planning, suppression of competing activities, restraint coping, and seeking instrumental social support. Five scales of the COPE Inventory measure aspects of emotion-focused coping, including: seeking of emotional social support, positive reinterpretation and growth, acceptance, denial, and turning to

religion. Three scales measure coping responses that are arguably less adaptive, including focus on and venting of emotions, behavioral disengagement, and mental disengagement (Carver *et al*., 1989).

In Carver, Scheier, and Weintraub's (1989) initial psychometric evaluation of the COPE Inventory, the subscales demonstrated adequate internal consistency for most of the scales (active coping $\alpha = 0.62$, acceptance $\alpha = 0.65$, planning $\alpha = 0.80$, seeking of instrumental social support $\alpha = 0.75$, focus on and venting of emotions $\alpha = 0.77$, denial $\alpha = 0.71$, mental disengagement $\alpha = 0.45$, behavioral disengagement $\alpha = 0.63$, positive reinterpretation and growth $\alpha = 0.68$, restraint coping $\alpha = 0.72$, turning to religion $\alpha = 0.92$, seeking of emotional social support $\alpha = 0.85$, and suppression of competing activities $\alpha = 0.68$). The authors attributed the low internal consistency of the mental disengagement scale to the scale's multiple-act criterion and argued that lower reliability should be expected as a result. Within the study sample, these COPE Inventory subscales also demonstrated similar internal consistency (active coping $\alpha = 0.72$, acceptance $\alpha = 0.71$, planning $\alpha = 0.83$, seeking of instrumental social support $\alpha = 0.87$, focus on and venting of emotions $\alpha = 0.88$, denial $\alpha = 0.78$, mental disengagement $\alpha = 0.39$, behavioral disengagement $\alpha = 0.64$, positive reinterpretation and growth $\alpha = 0.67$, restraint coping $\alpha = 0.64$, turning to religion $\alpha = 0.94$, seeking of emotional social support $\alpha = 0.91$, and suppression of competing activities $\alpha = 0.62$).

Finally, a set of questions were rationally-derived to assess basic descriptive variables, knowledge of someone killed or injured in the attacks, and the subjective impact of the September 11th attacks on thoughts and behaviors. These questions were administered in the initial wave of data collection at Time 1 of the study. To assess personal knowledge of victims of the attacks, participants were asked, "Did you know someone who was killed or injured in the terrorist attack on September 11, 2001?" Respondents could answer "yes" or "no," and then they were prompted with the question, "If yes, who?"

Six items, assessed on an 11-point Likert-style scale, measured subjective impact of the attacks on thoughts and behaviors and included the following statements: "On a scale of 0–10 (0 = safe as before, 10 = much less safe), do you perceive the world as less safe after the attack?" "On a scale of 0–10 (0 = extremely unlikely, 10 = extremely likely), do you think that another attack is likely?" "On a scale of 0–10 (0 = extremely unlikely, 10 = extremely likely), do you think that war is likely in the future?" "On a scale of 0–10 (0 = no change, 10 = definite changes), have you changed your routine or travel plans as a result of the attack?" "On a scale of 0–10 (0 = unaffected, 10 = extremely affected), how affected were you initially by the attack?" "On a scale of 0–10 (0 = not angry, 10 = very angry), how much anger do you feel about the attacks?" A composite score, composed of all these items assessing the subjective indirect impact of the September 11th attacks, was also created for use in the regression analyses. The scale demonstrated adequate internal consistency (Cronbach's $\alpha = 0.68$).

RESULTS

Participant Attrition

With only 69.10% of the initial sample choosing to participate again at Time 2 of the study, it was important to examine whether there were significant differences between

individuals who did and did not participate. Independent sample t-tests were conducted, and results indicated that those who did not participate at Time 2 had significantly higher anxiety scores (Did not participate: $M = 15.96$, $SD = 10.36$; Did participate: $M = 12.15$, $SD = 8.24$, $t(170) = 2.38$, $p < 0.020$) and endorsed significantly more changes in their routine or travel plans as a result of the attacks at Time 1 (Did not participate: $M = 3.81$, $SD = 3.87$; Did participate: $M = 2.39$, $SD = 3.08$, $t(175) = 2.41$, $p < 0.001$). Those who did not participate also reported significantly more anger about the attacks at Time 1 than those who did participate (Did not participate: $M = 7.93$, $SD = 2.49$; Did participate: $M = 6.93$, $SD = 2.71$, $t(176) = 2.33$, $p < 0.021$). Additionally, more women (76.79%) than men (56.06%) from the original sample chose to participate at Time 2 of the study. The significant differences between the Time 1 and Time 2 samples may impact the interpretation of changes between the two study time points.

Measure of Impact

Next, we derived a method of categorizing the 11-point Likert-style scales in order to reflect the degree of impact of September 11th stressors. No impact was indicated by a score of zero. Mild impact was operationalized as a score between one and three. Moderate impact was indicated by a score of four to six, and severe impact was indexed by a score of seven to ten. Based on the categorizing scheme, 43.82% of the sample reported severe safety concerns since the September 11th attacks. 60.12% of the sample reported a strong likelihood that another terrorist attack would occur in the future, while 83.15% of the sample reported that war was extremely likely in the future. In addition, 19.21% of the college students sampled reported that they had definitively changed their routines or travel plans as a result of the September 11th attacks. As expected, 67.98% reported the global emotional impact of the September 11th attacks as severe, and 66.85% reported that they were severely angry about the attacks (see Table I).

Changes in Anxiety from T1 to T2

Time 1 questionnaires were administered over a two-month time period in the study. Prior to conducting any analyses with the BAI, it was important to determine that there was no association between Time 1 anxiety severity and the days elapsed between the September 11th attacks and the completion of Time 1 questionnaires. A Pearson correlation demonstrated no significant association between the number of days elapsed and initial anxiety scores.

TABLE I Subjective Impact of September 11th Stressors by Degree of Endorsement ($N = 178$)

Item	*Mild 1–3*	*Moderate 4–6*	*Severe 7–10*
Do you perceive the world as less safe after the attack?	21.35%	31.90%	43.82%
Do you think that another attack is likely?	10.11%	28.65%	60.12%
Do you think that war is likely in the future?	3.93%	12.36%	83.15%
Have you changed your routine or travel plans as a result of the attack?	26.55%	11.86%	19.21%
How affected were you initially by the attack?	5.62%	24.72%	67.98%
How much anger do you feel about the attacks?	7.87%	22.47%	66.85%

Paired sample t-tests were used to examine changes in anxiety from Time 1 to Time 2. For the sample that participated at both study time points, scores on the BAI were significantly higher at Time 1 of the study ($M = 12.15$, $SD = 8.24$) than at Time 2 ($M = 7.59$, $SD = 7.03$, $t(117) = 6.56$, $p < 0.001$).

Both mean Time 1 and mean Time 2 anxiety scores were indicative of mild levels of anxiety (Antony, Orsillo, & Roemer, 2001). We compared the mean Time 1 BAI score ($M = 13.35$, $SD = 9.10$) for our total sample with data from other published studies in an attempt to determine if initial anxiety was higher than normal rates for similar populations. Mean Time 1 BAI scores in our sample were significantly higher than mean BAI scores ($M = 10.75$, $SD = 9.12$, $t(171) = 2.97$, $p < 0.005$) in a study examining a large sample of psychology undergraduates (Borden, Peterson, & Jackson, 1991). However, mean BAI scores were not significantly higher than another study examining a college sample ($M = 13.41$, $SD = 8.96$; Osman, Kopper, Barrios, Osman, & Wade, 1997).

With a sample including college freshmen, it was important to examine whether anxiety severity within the sample may have been elevated at Time 1 and decreased at Time 2 because of freshmen participants' adjustment to university life. To examine this, Pearson correlations were conducted between age and anxiety at both study time points. Results indicated no significant association between age and initial or longer term anxiety. Additionally, freshman anxiety might have been expected to peak at the end of the semester during final exams. Analyses, however, revealed lower anxiety levels at Time 2, which further suggests that observed anxiety levels were not merely a response to college adjustment.

Predictors of Anxiety

In the first step, we conducted Pearson correlations and independent sample t-tests, to determine what variables were associated with anxiety in the sample. We calculated separate zero-order correlations between BAI scores at Time 1 and Time 2 and the following variables: each of the individual items from the composite scale measuring subjective indirect impact of the terrorist attacks, the total subjective indirect impact scale score, and all of the COPE Inventory subscales. Due to the exploratory nature of these analyses, 40 separate analyses were conducted. After conducting Bonferroni's correction for multiple comparisons, Time 1 BAI scores were significantly positively associated with belief in the world as a less safe place, belief in the likelihood of another attack, and the following coping strategies: focus on and venting of emotions, mental disengagement, behavioral disengagement, and denial (see Table II & Table III).

Again after correcting for multiple comparisons, Time 2 anxiety severity was significantly positively correlated with belief in the likelihood of another attack, focus on and venting of emotions, and mental disengagement. Notably, Time 2 anxiety was no longer significantly correlated with behavioral disengagement, denial, and belief that the world was less safe since the attacks (see Table II & Table III).

Analyses were also conducted to determine whether knowledge of someone killed or injured in the September 11th attacks was associated with a significant difference in anxiety severity at both time points of the study. There were no significant differences in BAI scores based on personal knowledge of attack victims at Time 1 or Time 2 of the study. However, participants with personal knowledge of victims of the attacks reported significantly higher levels of anger about the attacks ($t(176) = 2.66$, $p < 0.009$).

TABLE II Cognitive and Behavioral Correlates of Beck Anxiety Inventory Scores at Two Time Intervals (Time 1 $N = 178$, Time 2 $N = 123$)

Correlates of Anxiety	*Time 1 BAI*	*Time 2 BAI*
Belief that the world is a less safe place since the attacks	0.300*	0.159
Belief in the likelihood of another attack	0.258*	0.305*
Belief in the likelihood of war	0.046	0.140
Changes in routine or travel plans as a result of the attacks	0.123	0.258
Initial effect of the attacks	0.075	0.068
Anger about the attacks	0.135	− 0.010
Total subjective indirect impact scale score	0.192	0.224

Note. Significance levels recalculated with Bonferroni's correction for multiple comparisons.
*$p < 0.001$.

Participants with personal knowledge of victims reported a mean anger rating of 8.28 ($SD = 2.24$) as compared to the mean rating of 6.97 ($SD = 2.72$) reported by participants without personal knowledge of victims. Participants with personal knowledge of victims also reported being significantly more initially affected by the attacks than participants with no personal knowledge of victims ($t(179) = 2.76$, $p < 0.006$). Those with personal knowledge of victims endorsed a mean impact rating of 8.25 ($SD = 1.79$) as compared to the mean rating of 7.07 ($SD = 2.40$) endorsed by participants without personal knowledge of victims of the attacks.

Two separate linear regression analyses were used to examine the unique association between various coping strategies and the severity of initial and long-term anxiety associated with the September 11th attacks. Prior to conducting both regression analyses, we conducted tests of multicollinearity for the multiple predictors used in each analysis. No evidence of multicollinearity was found. Focus on and venting of emotions, mental disengagement, behavioral disengagement, and denial were chosen as coping predictors based on their significant correlations with Time 1 anxiety.

The first analysis was a simultaneous multiple linear regression analysis using these four maladaptive coping strategies and the total subjective indirect impact scale score as predictors of Time 1 BAI severity. This model significantly predicted Time 1 anxiety

TABLE III COPE Inventory Subscale Correlates of Beck Anxiety Inventory Scores at Two Time Intervals (Time 1 $N = 178$, Time 2 $N = 123$)

Correlates of Anxiety	*Time 1 BAI*	*Time 2 BAI*
Focus on and Venting of Emotions	0.247*	0.338*
Mental Disengagement	0.381*	0.350*
Behavioral Disengagement	0.281*	0.130
Denial	0.367*	0.211
Active Coping	− 0.024	0.067
Acceptance	− 0.093	− 0.005
Planning	0.016	0.095
Seeking of Instrumental Social Support	0.115	0.210
Positive Reinterpretation and Growth	0.100	0.133
Restraint Coping	0.030	− 0.017
Turning to Religion	0.106	0.167
Seeking of Emotional Social Support	0.105	0.264
Suppression of Competing Activities	0.096	0.000

Note. Significance levels recalculated with Bonferroni's correction for multiple comparisons.
*$p < 0.001$.

($F(5, 156) = 11.26$, $p < 0.001$, $R^2 = 0.27$). All coping strategies accounted for significant unique variance in initial anxiety severity, and increased endorsement of the use of all coping strategies was associated with higher levels of Time 1 anxiety. Scores on the subjective indirect impact scale demonstrated a trend, but did not reach the level of significance in the analysis (see Table IV).

The second regression analysis utilized hierarchical regression to examine predictors of Time 2 BAI scores while controlling for initial anxiety severity. Accordingly, Time 1 BAI scores were entered as a predictor in the first step. In the second step, the four coping strategies and the total subjective indirect impact score were entered as predictors. The hierarchical regression equation in the second analysis also significantly predicted Time 2 anxiety. After controlling for initial anxiety severity, only the coping style, focus on and venting of emotions, accounted for significant unique variance in Time 2 anxiety scores. Increases in the use of this coping style were associated with higher levels of Time 2 anxiety (see Table V).

DISCUSSION

Although indirectly exposed to mass violence, the majority of college students evaluated in this study were severely psychologically impacted by the tragic events on and after September 11th. Indirect exposure to mass violence affected significant changes in perceptions of vulnerability and probability estimates of future harm. Although they were hundreds of miles away, undergraduate students in Boston

TABLE IV Summary of Simultaneous Regression Analysis for Variables Predicting Time 1 BAI Scores ($N = 161$)

Predictor	*B*	*SE B*	*β*
Denial	0.759	0.285	0.204**
Mental disengagement	0.864	0.270	0.229**
Focus on & venting of emotions	0.359	0.180	0.143*
Behavioral disengagement	0.800	0.380	0.157*
Subjective indirect impact	0.114	0.065	0.126

Note. Predictor variables were limited to the hypothesized maladaptive coping styles and the subjective indirect impact scale.
*$p < .05$. **$p < .01$.

TABLE V Summary of Hierarchical Regression Analysis for Variables Predicting Time 2 BAI Scores ($N = 109$)

Predictor	*F*	R^2	ΔR^2	*B*	*SE B*	*β*
Step 1	39.271	0.267	0.267			
Time 1 BAI				0.437	0.070	0.516***
Step 2	8.703	0.335	0.069			
Focus on & venting of emotions				0.417	0.170	0.209*
Mental disengagement				0.446	0.255	0.151
Behavioral disengagement				−0.091	0.341	−0.022
Denial				−0.044	0.266	0.015
Subjective indirect impact				0.012	0.050	0.020

*$p < .05$. **$p < 0.01$. ***$p < 0.001$.

reported feelings of anger and anxiety initially in response to the terrorist attacks on September 11th. These results suggest that indirect exposure to mass violence results in an initial disruption in core beliefs and assumptions about personal and collective safety and security, which are commonly impacted by exposure to psychological trauma (e.g. Janoff-Bulman, 1992; McCann & Pearlman, 1990; Resick, Nishith, Weaver, Astin, & Feuer, 2002). However, the psychological impact of indirect exposure to mass violence appears to decay over time for most people. In our study, anxiety scores were considerably lower over time despite the steady news coverage of the impact of September 11th on survivors, reports of war activities, actual Anthrax exposures, and dire predictions of future attacks. The study results are supported by research demonstrating an initial increase and subsequent decrease in PTSD symptoms among victims of other disasters (Norris, Friedman, Watson, Byrne, Diaz, & Kaniasty, 2002), as well as among Americans after September 11th (Silver *et al*., 2002).

We found that a variety of negative or maladaptive coping strategies (denial, behavioral disengagement, mental disengagement, and focus on and venting of emotions) were associated with anxiety in response to indirect exposure to mass violence. These results are consistent with the limited existing research in this area and further support the maladaptive nature of the use of avoidance coping, specifically denial, mental disengagement, and behavioral disengagement, in response to traumatic events (Collins, Baum, & Singer, 1983; Norris *et al*., 2002; Silver *et al*., 2002).

Similar to denial, mental disengagement, and behavioral disengagement, focus on and venting of emotions was also found to be associated with increased concomitant anxiety approximately two months after the September 11th attacks. However, after controlling for initial anxiety, anxiety at the follow-up interval, approximately four months after the attacks, was predicted exclusively by focus on and venting of emotions. This suggests that those who continued to feel anxious about the September 11th attacks were likely to cope with their feelings of vulnerability, anger, and future threat by focusing on and venting their emotions about the attacks. It remains unclear, however, whether this coping characteristic is a cause or an effect of anxiety related to indirect exposure to mass violence or whether focusing on emotional impact reflects a trait characteristic.

Unlike previous findings with trauma exposure (e.g. Silver *et al*., 2002; Solomon *et al*., 1988), results from our study did not demonstrate a significant inverse relationship between problem-focused coping strategies and distress. The reasons for this lack of findings, however, are unclear.

Our study results also suggest that personal knowledge of victims of a terrorist attack (20% of our sample) strengthens the nature of exposure to the event in the indirectly affected population. However, personal knowledge of victims does not appear to impact anxiety, but rather other emotions and experiences. Individuals in this study with personal knowledge of victims endorsed significantly greater feelings of anger and a greater sense of being initially affected by the attacks. These findings are somewhat inconsistent with previous research examining indirectly affected youths after the Oklahoma City Bombing, which found that participants with indirect knowledge of victims (41% of the total sample) had greater levels of PTSD symptomatology (Pfefferbaum *et al*., 2000).

A major limitation of this study is the inability of the study design to establish a causal relationship between the September 11th attacks and the anxiety reported by the

study sample. The unpredictable nature of terrorism places unavoidable constraints on research that attempts to study its psychological impact. As a result, no data were available on anxiety severity in the sample prior to the attacks. Without pre-attack data, it is impossible to determine with certainty whether there was an increase in anxiety as a direct result of the September 11th attacks. Additionally, comparison of mean Time 1 anxiety scores with published data in college samples resulted in conflicting findings. Therefore, we are unable to determine whether anxiety was elevated from normal levels in our sample following the terrorist attacks. Additionally, loss of more anxious participants from Time 1 to Time 2 of the study makes it difficult to interpret the decay of initial anxiety over time.

Another study limitation is the lack of data collection of other pre-trauma variables, such as prior trauma histories and diagnoses of psychiatric disorders, which have been demonstrated to influence the development of symptomatology after exposure to other types of trauma (e.g. Follete, Polusny, & Milbeck, 1994; Asarnow *et al*., 1999). Also, the internal consistency of our scale measuring the subjective indirect impact of the September 11th attacks was relatively low. The change in questionnaire administration from Time 1 to Time 2 of the study necessitates the consideration of method variance as an explanation for observed changes in anxiety over time. Also, a higher attrition rate of men from the follow-up time point and lack of Time 2 participation by individuals with higher initial anxiety, increased anger, and more avoidance of terrorism related stimuli limits the generalizability of the Time 2 results.

Despite these limitations, this study is one of the first to investigate the composition of a stress reaction after indirect exposure to terrorism and to examine predictors of terrorism-related anxiety prospectively. United States' governmental officials have publicly stated that another terrorist attack in the United States is ''almost certain,'' and that future terrorism is ''not a matter of if, but when'' (Allen, 2002). Given the likelihood of a future attack, additional indirect exposures seem imminent. This study suggests that future research should be undertaken to examine the enduring psychological impact of indirect exposure to mass violence.

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